

Notes 2/11 - Writing Equations of Exponential Functions

Parent Function: $y = a \cdot b^x$

↓
y-intercept $(0, a)$
start point / initial amount

↓ growth or decay factor
How you get from one y-value to the next consecutive y-value

Ex 1: Write the equation of the exponential function through the points $(0, 5)$ and $(1, 15)$

x	y
0	5
1	15

$2 \cdot 3 = b$

$b = \frac{15}{5} = 3$

$a = 5$

$$y = 5 \cdot 3^x$$

Ex 2: Through the points $(0, 12)$ and $(1, 3)$

$a = 12$

x	y
0	12
1	3

$2 \div 4 \Rightarrow \times \frac{1}{4}$

$b = \frac{3}{12}$

$$y = 12 \left(\frac{1}{4} \right)^x$$

Ex 3: Through $(2, 12)$ and $(3, 24)$

x	y
0	3
1	6
2	12
3	24

$y \div 2$

$y \div 2$

$2 \times 2 = b$

$b = \frac{24}{12} = 2$

$y = a \cdot b^x$

$y = a \cdot 2^x$

$12 = a \cdot 2^2$

$12 = 4a$
 $\frac{12}{4} = \frac{4a}{4}$

$a = 3$

$$y = 3 \cdot 2^x$$

Method 1

Method 2

Ex 4: Through $(0, 3)$ and $(4, 21)$
 $a=3$

$$y = 3 \cdot b^x$$

$$\frac{21}{3} = \frac{3 \cdot b^4}{3}$$

$$\sqrt[4]{7} = \sqrt[4]{b^4}$$

$$b \approx 1.63$$

On Calc

4, Math, 5: $\sqrt[4]{}$, 7, enter

$$\boxed{y = 3(1.63)^x}$$